

IN THE CLAIMS

This listing of claims replaces all prior listings:

1. (Currently Amended) A magneto-optical disk having comprising:
a recording layer made of a magnetic film having a magnetic anisotropy in a vertical perpendicular direction to a film surface of a substrate on of the substrate magnetic film,
wherein-said recording layer having comprises: (1) a main recording region for recording first information, (2) a sub recording region formed on an inner circumference side from said main recording region and for recording second information including disk discrimination information, and (3) a buffer region formed between said main recording region and said sub recording region and for recording third information,
wherein,
said second information is recorded in a form of a mark array formed in stripe shapes in a radial direction of said disk in said sub recording region and said buffer region,
a plurality of marks constituting said mark array being are parts having a changed in magnetization state [[of]] in said recording layer, and wherein
said third information can be reproduced by a modulation signal of a reflection ratio along a circumferential direction of the magneto-optical disk.
2. (Currently Amended) A magneto-optical disk as set forth in claim 1, wherein each one of said mark marks is formed by irreversible elimination or degradation of the magnetism of said recording layer.
3. (Currently Amended) A magneto-optical disk as set forth in claim 1, wherein each one of said mark marks is formed by inverting the magnetization of said recording layer.
4. (Currently Amended) A magneto-optical disk as set forth in claim 1, wherein said mark array is formed in a meandering shape along the circumferential direction of the disk and a

size of said buffer region in the disk radial direction has at least the amplitude of said meandering shape.

5. (Currently Amended) A magneto-optical disk as set forth in claim 4, wherein: each one of said mark marks comprises a plurality of mark elements formed connected in at least a radial direction of said magneto-optical disk, said mark array comprises a plurality of mark element arrays formed substantially concentrically, and said mark element arrays comprise pluralities of mark elements formed along a circumferential direction of said magneto-optical disk.

6. (Original) A magneto-optical disk as set forth in claim 5, wherein: each said mark element is formed by focusing pulse light having a predetermined beam shape, each said mark element array is formed by focusing said pulse light at a predetermined position while rotating said magneto-optical disk, said mark element arrays are formed by focusing said pulse light at different positions from each other, and an amplitude of meandering includes an offset of an actual center of rotation of said magneto-optical disk and an ideal center axis of said magneto-optical disk.

7. (Original) A magneto-optical disk as set forth in claim 6, wherein said meandering is caused by at least eccentricity of said magneto-optical disk.

8. (Original) A magneto-optical disk as set forth in claim 6, wherein said meandering is caused by at least wobbling of a shaft for rotating said magneto-optical disk.

9. (Original) A magneto-optical disk as set forth in claim 1, wherein said third information includes control data indicating physical attributes of said magneto-optical disk.

10. (Original) A magneto-optical disk as set forth in claim 1, wherein said third information is recorded by pits.

11. (Original) A magneto-optical disk as set forth in claim 1, wherein said third information is recorded by a wobbling groove.

12. (Original) A magneto-optical disk as set forth in claim 1, wherein: said first information is reproduced based on rotation of a polarization direction of light striking said main recording region, and said second information is reproduced based on rotation of a polarization direction of light striking at least one of said sub recording region and said buffer region.

13. (Original) A magneto-optical disk as set forth. in claim 12, wherein: at least said first information is reproduced by heating part of said recording layer by focusing of light, said recording layer is a multiple layer film comprised of at least a first magnetization layer, a second magnetization layer, and a third magnetization layer stacked together, and among a Curie temperature T_{c1} of said first magnetization layer, a Curie temperature T_{c2} of said second magnetization layer, and a Curie temperature T_{c3} of said third magnetization layer, a Curie temperature T_{c2} of said second magnetization layer is the lowest.

14. (Original) A magneto-optical disk as set forth in claim 1, wherein: said sub recording region is formed to a radius of 14.5 to 15.7 mm, and said buffer region is formed to a radius of 15.7 to 16.0 mm.

15. (Currently Amended) A method for recording, on a magneto-optical disk having a main recording region in which first information is recorded, second information including disk discrimination information and third information including physical attributes of said magneto-optical disk, comprising:

a step of forming a track having a reflection ratio changing along a circumferential direction of said magneto-optical disk in a buffer region provided on an inner circumference side of said main recording region and recording said third information; and

a step of forming a stripe-shaped mark array in a sub recording region provided on the inner circumference side of said buffer region and recording said second information,

wherein

said step of recording the second information includes [[:]] (1) a step of rotating said magneto-optical disk and focusing pulse light on said magneto-optical disk ~~in~~ with a tracking servo in the OFF state and (2) a step of forming part of said meandering mark array in said buffer region and recording said second information in said buffer region overlapped with said third information.

16. (Original) A method of recording of a magneto-optical disk as set forth in claim 15, wherein said step of forming said mark array includes a step of irreversibly eliminating or degrading magnetism in part of said recording layer.

17. (Original) A method of recording of a magneto-optical disk as set forth in claim 16, further comprising a step of irreversibly eliminating or degrading magnetism in part of said recording layer, then uniformly magnetizing the parts of said recording layer not irreversibly eliminated or degraded in magnetism.

18. (Original) A method of recording of a magneto-optical disk as set forth in claim 15, wherein said step of forming said mark array includes: a step of uniformly magnetizing said recording layer and a step of inverting the magnetization in part of the recording layer to magnetize it.

19. (Currently Amended) A method of recording of a magneto-optical disk as set forth in claim 15, further comprising the step of recording said first information in said main recording region ~~in the state with~~ the tracking servo control applied in the ON state.

20. (Original) A method of recording of a magneto-optical disk as set forth in claim 15, wherein said step of recording said third information includes a step of forming pits at said buffer region.

21. (Original) A method of recording of a magneto-optical disk as set forth in claim 15, wherein said step of recording said third information includes a step of forming a wobbling groove at said buffer region.

22. (Currently Amended) A method of recording of a magneto-optical disk as set forth in claim 15, wherein said step of recording said second information is performed ~~in a state~~ with the tracking servo control applied in the ON state.

23. (Currently Amended) A method of reproduction of a magneto-optical disk having a recording layer comprised of at least a first magnetization layer, a second magnetization layer, and a third magnetization layer successively stacked from a light focusing side, formed with a main recording region, ~~and~~ a sub recording region and a buffer region in said recording layer, and having a Curie temperature T_{c2} of said second magnetization layer lowest among a Curie temperature T_{c1} of said first magnetization layer, a Curie temperature T_{c2} of said second magnetization layer, and a Curie temperature T_{c3} of said third magnetization layer, comprising:

a step of reproducing first information recorded in said main recording region by focusing light having an intensity resulting in a temperature T_r of the recording layer becoming larger than T_{c2} ; and

a step of reproducing second information including disk discrimination information recorded in said sub recording region and said buffer region by focusing light having an intensity resulting in the temperature T_r of said recording layer becoming smaller than T_{c2} , said first information being reproduced by control based on said reproduced second information.

24. (Original) A method of reproduction from a magneto-optical disk as set forth in claim 23, wherein said step of reproducing first information includes a step of heating part of

said recording layer by focusing of light and detecting a rotation of the polarization direction of said light.

25. (Original) A method of reproduction from a magneto-optical disk as set forth in claim 23, wherein said step of reproducing second information includes a step of detecting rotation of the polarization direction of said light.

26. (Currently Amended) A method of reproduction from a magneto-optical disk having a main recording region in which first information is recorded and having recorded second information including disk discrimination information of said magneto-optical disk and third information including physical attributes of said magneto-optical disk, comprising:

a step of reproducing said second information recorded by in a stripe-shaped mark array formed at part of the buffer region provided on the inner circumference side of said main recording region and of a sub recording region provided on the inner circumference side of said buffer region in with a tracking servo control in the OFF state; and

a step of reproducing said third information recorded in said buffer region by a modulation signal of a reflection ratio along a circumferential direction of the disk.

27. (Original) A method of reproduction from a magneto-optical disk as set forth in claim 26, further comprising the step of control according to said reproduced second information to record or reproduce said first information in said main recording region.

28. (Currently Amended) A method of reproduction from a magneto-optical disk as set forth in claim 26, wherein said step of reproducing second information is performed with a focus servo control applied.

29. (Original) A method of reproduction from a magneto-optical disk as set forth in claim 26, wherein said step of reproducing third information includes a step of reproducing said third information recorded in said buffer region overlapped on said second information.

30. (Original) A method of reproduction from a magneto-optical disk as set forth in claim 26, wherein said step of reproducing second information includes a step of detecting rotation of a polarization direction of said light.

31. (Original) A method of reproduction from a magneto-optical disk as set forth in claim 27, wherein said step of reproducing first information includes a step of heating part of said recording layer by focusing of light and detecting a rotation of the polarization direction of said light.

32. (Currently Amended) A method of reproduction from a magneto-optical disk as set forth in claim 27, wherein said step of recording or reproducing the first information is carried out ~~in a state~~ with the tracking servo control applied in the ON state.

33. (Currently Amended) An apparatus for recording a data on a magneto-optical disk having a recording layer made of a magnetic film having magnetic anisotropy in a vertical perpendicular direction to a ~~film surface of a substrate~~ on the substrate magnetic film, wherein said recording layer ~~has~~ having (1) a main recording region for recording first information, (2) a sub recording region formed on an inner circumference side from said main recording region and recording second information including disk discrimination information, and (3) a buffer region formed between said main recording region and said sub recording region and recording third information[[:]], said second information is recorded in a form of a mark array formed in stripe shapes in said sub recording region and said buffer region, a plurality of marks constituting said mark array being parts changed in magnetization state of said recording layer[[:]], and said third information can be reproduced by a modulation signal of a reflection ratio along a circumferential direction of the magneto-optical disk, said second information including disk discrimination information and third information including physical attributes of said magneto-optical disk, comprising:

a ~~means~~ track forming unit for forming a track having a reflection ratio changing along a circumferential direction of the disk in a buffer region provided on an inner circumference side of the main recording region and recording the third information; ~~and~~

a ~~means~~ an array forming unit for forming a stripe-shaped mark array in a sub recording region provided on the inner circumference side of the buffer region and recording the second information; ~~wherein; and~~

a ~~the means~~ recording unit for recording the second information includes a ~~means~~ rotating unit for rotating the magneto-optical disk and focusing pulse light on the magneto-optical disk ~~in with~~ a tracking servo control in the OFF state; and

a ~~means~~ a mark array forming unit for forming part of the meandering mark array in the buffer region and recording the second information in the buffer region overlapped with the third information.

34. (Currently Amended) An apparatus for recording a data on a magneto-optical disk as set forth in claim 33, wherein said ~~means~~ unit for forming a mark array irreversibly eliminates or degrades the magnetism at part of said recording layer.

35. (Currently Amended) An apparatus for recording a data on a magneto-optical disk as set forth in claim 34, wherein said ~~means~~ unit for forming a mark array irreversibly eliminates or degrades magnetism in part of said recording layer, then uniformly magnetizes the parts of said recording layer not irreversibly eliminated or degraded in magnetism.

36. (Currently Amended) An apparatus for recording a data on a magneto-optical disk as set forth in claim 33, wherein said ~~means~~ unit for forming said mark array uniformly magnetizes said recording layer and inverts the magnetization in part of the recording layer to magnetize it.

37. (Currently Amended) An apparatus for recording a data-on a magneto-optical disk as set forth in claim 33, further comprising a means unit for recording said first information in said main recording region ~~in the state~~ with the tracking servo control ~~applied in the ON state~~.

38. (Currently Amended) An apparatus for recording a data on a magneto-optical disk as set forth in claim 33, wherein said means unit for recording said third information forms pits at said buffer region.

39. (Currently Amended) An apparatus for recording a data on a magneto-optical disk as set forth in claim 33, wherein said means unit for recording said third information includes a step of forming a wobbling groove at said buffer region.

40. (Currently Amended) An apparatus for recording a data on a magneto-optical disk as set forth in claim 33, wherein said means unit for recording second information operates ~~in a state~~ with the tracking servo control ~~applied in the ON state~~.

41. (Currently Amended) An apparatus for reproducing a data from a magneto-optical disk having a recording layer comprising at least a first magnetization layer, a second magnetization layer, and a third magnetization layer successively stacked from a light focusing side, formed with a main recording region, ~~and~~ a sub recording region and a buffer region in said recording layer, and having a Curie temperature Tc2 of said second magnetization layer lowest among a Curie temperature Tc1 of said first magnetization layer, a Curie temperature Tc2 of said second magnetization layer, and a Curie temperature Tc3 of said third magnetization layer, comprising:

a means reproducing unit for reproducing first information recorded in said main recording region by focusing light having an intensity resulting in a temperature Tr of the recording layer becoming larger than Tc2, and

a means reproducing unit for reproducing second information including disk discrimination information recorded in said sub recording region and in said buffer region by

focusing light having an intensity resulting in the temperature T_r of said recording layer becoming smaller than T_{c2} , said first information being reproduced by control based on said reproduced second information.

42. (Currently Amended) An apparatus for reproducing information from a magneto-optical disk as set forth in claim 41, wherein said ~~means~~ unit for reproducing first information heats part of said recording layer by focusing of light and detects a rotation of the polarization direction of said light.

43. (Currently Amended) An apparatus for reproducing information from a magneto-optical disk as set forth in claim 41, wherein said ~~means~~ unit for reproducing second information detects rotation of the polarization direction of said light.

44. (Currently Amended) An apparatus for reproducing of information from a magneto-optical disk having a recording layer made of a magnetic film having magnetic anisotropy in a ~~vertical-perpendicular~~ direction to a ~~film surface of a substrate on the substrate magnetic film~~, wherein said recording layer has a main recording region for recording first information, a sub recording region formed on an inner circumference side from said main recording region and recording second information including disk discrimination information, and a buffer region formed between said main recording region and said sub recording region and recording third information; said second information is recorded in a form of a mark array formed in stripe shapes in said sub recording region and said buffer region, a plurality of marks constituting said mark array being parts having a changed ~~in~~ magnetization state ~~[[of]]~~ in said recording layer; and said third information can be reproduced by a modulation signal of a reflection ratio along a circumferential direction of the magneto-optical disk, comprising:

a ~~means~~ reproducing unit for reproducing said second information recorded by a stripe-shaped matrix array formed at part of said buffer region provided at the inner circumference side of the main recording region and said sub recording region provided at the inner circumference side of said buffer region in a state with no tracking servo control applied, and

a means reproducing unit for reproducing said third information recorded at said buffer region by a modulation signal of a reflection ratio along the circumferential direction of said magneto-optical disk.

45. (Currently Amended) An apparatus for reproduction of a magneto-optical disk as set forth in claim 44, further comprising a means unit for control according to said reproduced second information to record or reproduce said first information in said main recording region.

46. (Currently Amended) An apparatus for reproduction of a magneto-optical disk as set forth in claim 44, wherein said means unit for reproducing second information operates with the focus servo control applied in the ON state.

47. (Currently Amended) An apparatus for reproducing information from a magneto-optical disk as set forth in claim 44, wherein said means unit for reproducing third information reproduces said third information recorded in said buffer region overlapped on said second information.

48. (Original) An apparatus for reproducing information from a magneto-optical disk as set forth in claim 44, wherein said means unit for reproducing second information detects rotation of a polarization direction of said light.

49. (Currently Amended) An apparatus for reproducing information from a magneto-optical disk as set forth in claim 44, wherein said means unit for reproducing first information heats part of said recording layer by focusing of light and detects a rotation of the polarization direction of said light.

50. (Currently Amended) An apparatus for reproducing information from of a magneto-optical disk as set forth in claim 44, wherein said means unit for recording or

reproducing the first information operates ~~in a state~~ with the tracking servo control ~~applied in the~~
ON state.